What is Claimed is:

1. A powder batch comprising nickel particles wherein said nickel particles are substantially spherical, have a weight average particle size of not greater than about 5 μm and a particle size distribution wherein at least about 90 weight percent of said particles are not larger than twice said average particle size and wherein said particles comprise crystallites having an average crystallite size of at least about 40 nanometers.

2. A powder batch as recited in Claim 1, wherein said particles comprise at least about 50 weight percent nickel metal.

3. A powder batch as recited in Claim 1, wherein said particles comprise at least about 80 weight percent nickel metal.

4. A powder batch as recited in Claim 1, wherein at least about 95 weight percent of said particles are not larger than twice said average particle size.

5. A powder batch as recited in Claim 1, wherein at least about 90 weight percent of said particles are not larger than 1.5 times said average particle size.

6. A powder batch as recited in Claim 1, wherein at least about 95 weight percent of said particles are not larger than 1.5 times said average particle size.

7. A powder batch as recited in Claim 1, wherein said average crystallite size is at least about 20 percent of said average particle size.

8. A powder batch as recited in Claim 1, wherein said average crystallite size is at least about 30 percent of said average particle size.

9. A powder batch as recited in Claim 1, wherein said average crystallite size is at least about 60 nanometers.

10. A powder batch as recited in Claim 1, wherein said average crystallite size is at least about 80 nanometers.

11. A powder batch as recited in Claim 1, wherein said particles have a particle density of at least about 7.1 g/cm^3.

12. A powder batch as recited in Claim 1, wherein said particles have a particle density of at least about 8.0 g/cm^3.

13. A powder batch as recited in Claim 1, wherein said particles have a particle density of at least about 8.4 g/cm^3.

14. A powder batch as recited in Claim 1, wherein said average particle size is from about 0.1 μm to about 3 μm.

15. A powder batch as recited in Claim 1, wherein said average particle size is from about 0.3 μm to about 1.5 μm.

16. A powder batch as recited in Claim 1, wherein said average particle size is from about 0.3 μm to about 0.8 μm.

17. A powder batch as recited in Claim 1, wherein not greater than about 0.5 weight percent of said particles are in the form of hard agglomerates.

18. A powder batch as recited in Claim 1, wherein said particles comprise a coating substantially encapsulating an outer surface thereof.

19. A powder batch as recited in Claim 1, wherein said particles are metal composite particles comprising a non-metallic phase dispersed throughout a metal phase.

20. A powder batch as recited in Claim 1, wherein said particles are metal composite particles comprising a metal oxide dispersed throughout a metal phase.

21. A powder batch as recited in Claim 1, wherein said powder batch has a specific surface area of not greater than about 3 m^2/g.

22. A powder batch as recited in Claim 1, wherein said particles comprise no more than about 0.1 atomic percent impurities.

23. A powder batch comprising nickel metal particles, wherein said metal particles comprise at least about 50 weight percent nickel metal and wherein said metal particles are substantially spherical, have a weight average particle size of from about 0.3 μm to about 1.5 μm and a particle size distribution wherein at least about 90 weight percent of said particles are not larger than 1.5 times said average particle size and wherein said metal particles comprise metal crystallites having an average crystallite size of at least about 40 nanometers and said particles have a particle density of at least about 8.0 g/cm^3.

24. A powder batch as recited in Claim 23, wherein said metal particles comprise at least about 80 weight percent nickel metal.

25. A powder batch as recited in Claim 23, wherein at least about 95 weight percent of said metal particles are not larger than 1.5 times said average particle size.

26. A powder batch as recited in Claim 23, wherein said average particle size is from about 0.3 μm to about 0.8 μm.

27. A powder batch as recited in Claim 23, wherein said average crystallite size is at least about 60 nanometers.

28. A powder batch comprising metal alloy particles, wherein said metal alloy particles comprise at least about 50 weight percent nickel metal and at least a first metal alloying element, and wherein said metal alloy particles are substantially spherical, have a weight average particle size of not greater than about 5 μm and an average crystallite size of at least about 40 nanometers.

29. A powder batch as recited in Claim 28, wherein said metal alloy particles have a particle size distribution wherein at least about 90 weight percent of said particles are not larger than twice said average particle size.

30. A powder batch as recited in Claim 28, wherein said first metal alloying element is selected from the group consisting of palladium, silver, gold, copper, tungsten, molybdenum, platinum, iron, tin and cobalt.

31. A powder batch as recited in Claim 28, wherein said first metal alloying element is palladium.

32. A powder batch as recited in Claim 28, wherein said first metal alloying element is homogeneously alloyed with said nickel metal with substantially no phase segregation.

33. A powder batch as recited in Claim 28, wherein said metal alloy particles comprise from about 0.1 to about 40 weight percent of said first metal alloying element based on the total amount of metal.

34. A powder batch as recited in Claim 28, wherein said metal alloy particles comprise from about 1 to about 15 weight percent of said first metal alloying element based on the total amount of metal.

35. A powder batch as recited in Claim 28, wherein said average particle size is from about 0.3 μm to about 1.5 μm.

36. A powder batch as recited in Claim 28, wherein said average crystallite size is at least about 60 nanometers.

37. A powder batch as recited in Claim 28, wherein said average crystallite size is at least about 20 percent of said average particle size.

38. A powder batch as recited in Claim 28, wherein said metal alloy particles have a lower sintering temperature than pure nickel metal particles.

39. A powder batch as recited in Claim 28, wherein said metal alloy particles have a higher sintering temperature than pure nickel metal particles.

40. A powder batch as recited in Claim 28, wherein said metal alloy particles have a higher vaporization temperature than pure nickel metal particles.

41. A powder batch as recited in Claim 28, wherein said metal alloy particles have increased oxidation resistance as compared to pure nickel metal particles.

42. A powder batch comprising coated nickel metal particles, said coated metal particles having a weight average particle size of not greater than about 5 μm and further comprising at least a first coating substantially encapsulating an outer surface of said particles.

43. A powder batch as recited in Claim 42, wherein said coated metal particles comprise crystallites having an average crystallite size of at least about 40 nanometers.

44. A powder batch as recited in Claim 42, wherein said weight average particle size is not greater than about 3 μm.

45. A powder batch as recited in Claim 42, wherein said weight average particle size is from about 0.3 μm to about 1.5 μm.

46. A powder batch as recited in Claim 42, wherein said coated metal particles have a particle size distribution wherein at least about 90 weight percent of said particles are not larger than twice said average particle size.

47. A powder batch as recited in Claim 42, wherein said coated metal particles have a particle size distribution wherein at least about 90 weight percent of said particles are not larger than 1.5 times said average particle size.

48. A powder batch as recited in Claim 42, wherein said coated metal particles are substantially spherical.

49. A powder batch as recited in Claim 42, wherein said first coating has an average thickness of not greater than about 100 nanometers.

50. A powder batch as recited in Claim 42, wherein said first coating has an average thickness of not greater than about 50 nanometers.

51. A powder batch as recited in Claim 42, wherein said first coating comprises a metal oxide.

52. A powder batch as recited in Claim 42, wherein said first coating comprises a

metal oxide selected from the group consisting of ZrO_2, NiO, SiO_2, B_2O_5, TiO_2, Cu_2O, CuO, Bi_2O_3, V_2O_5 and Al_2O_3.

53. A powder batch as recited in Claim 42, wherein said first coating comprises a metal oxide selected from the group consisting of SiO_2 and Al_2O_3.

54. A powder batch as recited in Claim 42, wherein said first coating comprises an organic compound.

55. A powder batch as recited in Claim 42, wherein said first coating is a monolayer coating.

56. A powder batch as recited in Claim 42, wherein said first coating is a particulate coating.

57. A powder batch as recited in Claim 42, wherein said first coating is a non-particulate coating.

58. A powder batch as recited in Claim 42, wherein said first coating inhibits the sintering of said metal particles at elevated temperatures.

59. A powder batch as recited in Claim 42, wherein said first coating enhances the sintering of said metal particles.

60. A powder batch as recited in Claim 42, wherein said first coating improves the dispersibility of said metal particles in a thick film paste.

61. A powder batch as recited in Claim 42, wherein said first coating increases the oxidation resistance of said particles.

62. A powder batch as recited in Claim 42, wherein said first coating comprises a metal.

63. A powder batch as recited in Claim 42, wherein said first coating comprises a copper-based metal.

64. A powder batch as recited in Claim 42, wherein said first coating comprises a noble metal.

65. A powder batch as recited in Claim 42, wherein said first coating comprises silver metal.

66. A powder batch as recited in Claim 42, wherein said coated metal particles further comprise a second coating substantially encapsulating said first coating.

67. A powder batch comprising metal composite particles, wherein said composite particles have a weight average particle size of not greater than about 5 μm and a particle size distribution wherein at least about 90 weight percent of said particles are not larger than twice said average particle size, and wherein said particles include a metal phase comprising nickel metal and at least a first non-metallic phase.

68. A powder batch as recited in Claim 67, wherein said composite particles comprise at least about 50 weight percent nickel metal.

69. A powder batch as recited in Claim 67, wherein said first non-metallic phase is dispersed throughout said metal phase.

70. A powder batch as recited in Claim 67, wherein said composite particles have an average particle size of not greater than about 3 μm.

71. A powder batch as recited in Claim 67, wherein said composite particles have an average particle size of from about 0.3 μm to about 1.5 μm.

72. A powder batch as recited in Claim 67, wherein at least about 90 weight percent of said composite particles are not larger than 1.5 times said average particle size.

73. A powder batch as recited in Claim 67, wherein said metal phase comprises crystallites having an average crystallite size of at least about 40 nanometers.

74. A powder batch as recited in Claim 67, wherein said first non-metallic phase comprises a metal oxide.

75. A powder batch as recited in Claim 67, wherein said first non-metallic phase comprises a metal oxide selected from the group consisting of NiO, SiO_2, Cu_2O, CuO, B_2O_3, TiO_2, ZrO_2, Bi_2O_3, CaO, V_2O_5 and Al_2O_3.

76. A powder batch as recited in Claim 67, wherein said first non-metallic phase is a dielectric compound selected from the group consisting of titanates, zirconates, silicates,

aluminates, tantalates and niobates.

77. A powder batch as recited in Claim 67, wherein said first non-metallic phase is a titanate.

78. A powder batch as recited in Claim 67, wherein said first non-metallic phase is selected from the group consisting of barium titanate and neodymium titanate.

79. A powder batch as recited in Claim 67, wherein said first non-metallic phase is carbon.

80. A powder batch as recited in Claim 67, wherein said composite particles comprise at least about 0.1 weight percent of said first non-metallic phase.

81. A powder batch as recited in Claim 67, wherein said composite particles comprise from about 0.2 to about 35 weight percent of said first non-metallic phase.

82. A powder batch as recited in Claim 67, wherein said composite particles have a higher sintering temperature than pure nickel metal particles.

83. A powder batch comprising metal composite particles, said composite particles having a weight average particle size of not greater than about 5μm, wherein said composite particles include a metal phase and at least a first non-metallic phase comprising a ceramic dielectric compound.

84. A powder batch as recited in Claim 83, wherein said metal phase comprises at least about 50 weight percent nickel metal.

85. A powder batch as recited in Claim 83, wherein said ceramic dielectric is selected from the group consisting of titanates, zirconates, silicates, aluminates, tantalates and niobates.

86. A powder batch as recited in Claim 83, wherein said ceramic dielectric is a titanate.

87. A powder batch as recited in Claim 83, wherein said ceramic dielectric is selected from the group consisting of barium titanate and neodymium titanate.

88. A powder batch as recited in Claim 83, wherein said composite particles have a weight average particle size of not greater than about 3 μm.

89. A powder batch as recited in Claim 83, wherein said composite particles have a weight average particle size of from about 0.3 μm to about 1.5 μm.

90. A powder batch as recited in Claim 83, wherein said particles have a particle size distribution wherein at least about 90 weight percent of said particles are not larger than twice said average particle size.

91. A powder batch as recited in Claim 83, wherein said first non-metallic phase is homogeneously dispersed throughout said metal phase.

92. A powder batch as recited in Claim 83, wherein said composite particles comprise at least about 0.1 weight percent of said first non-metallic phase.

93. A powder batch as recited in Claim 83, wherein said composite particles comprise from about 0.2 to about 35 weight percent of said first non-metallic phase.

94. A powder batch as recited in Claim 83, wherein said composite particles comprise from about 0.2 to about 5 weight percent of said first non-metallic phase.

95. A multilayer ceramic capacitor comprising internal electrodes fabricated from a powder batch as recited in Claim 83.

96. A thick film paste composition suitable for screen printing onto a substrate, comprising:

a) a binder phase;

b) an organic vehicle phase; and

c) a functional phase, said functional phase comprising nickel metal particles, wherein said nickel metal particles are substantially spherical, have a weight average particle size of not greater than about 5 μm and an average crystallite size of at least about 40 nanometers.

97. A paste composition as recited in Claim 96, wherein said nickel metal particles have a particle size distribution wherein at least about 90 weight percent of said metal particles are not larger than twice said average particle size.

98. A paste composition as recited in Claim 96, wherein said nickel metal particles have a particle size distribution wherein at least about 95 weight percent of said metal particles are not larger than twice said average particle size.

99. A paste composition as recited in Claim 96, wherein said average particle size in not greater than about 3 μm.

100. A paste composition as recited in Claim 96, wherein said average particle size is from about 0.3 μm to about 1.5 μm.

101. A paste composition as recited in Claim 96, wherein said binder phase comprises a glass frit.

102. A paste composition as recited in Claim 96, wherein said organic vehicle phase comprises a high molecular weight polymer dissolved in a solvent.

103. A paste composition as recited in Claim 96, wherein said organic vehicle phase comprises a polymer dissolved in a solvent, wherein said polymer is selected from the group

consisting of ethyl cellulose, polyvinyl acetate, cellulose resin and acrylic resin and said solvent is selected from the group consisting of methanol, ethanol, terpineol, butyl carbitol, butyl carbitol acetate, aliphatic alcohols, esters, and acetone.

104. A paste composition as recited in Claim 96, wherein said paste composition comprises from about 5 to about 95 weight percent of said nickel metal particles.

105. A paste composition as recited in Claim 96, wherein said paste composition comprises from about 60 to about 85 weight percent of said nickel metal particles.

106. A paste composition as recited in Claim 96, wherein said nickel metal particles are composite particles comprising nickel metal and a non-metallic phase.

107. A paste composition as recited in Claim 96, wherein said nickel metal particles are composite particles comprising nickel metal and a non-metallic phase dispersed throughout said nickel metal.

108. A paste composition as recited in Claim 96, wherein said nickel metal particles are coated metal particles comprising a coating substantially encapsulating said particles.

109. A paste composition as recited in Claim 96, wherein said nickel metal particles are coated metal particles comprising a metal oxide coating substantially encapsulating said particles.

110. A thick film paste composition suitable for screen printing onto a substrate, comprising:

a) a binder phase;

b) an organic vehicle phase; and

c) a functional phase, said functional phase comprising composite nickel metal particles having a weight average particle size of not greater than about 5 μm, said composite particles including a metal phase and at least a first non-metallic phase.

111. A paste composition as recited in Claim 110, wherein said composite metal particles have a particle size distribution wherein at least about 90 weight percent of said particles are not larger than twice said average particle size.

112. A paste composition as recited in Claim 110, wherein said composite particles comprise at least about 50 weight percent nickel metal.

113. A paste composition as recited in Claim 110, wherein said first non-metallic phase comprises a metal oxide.

114. A paste composition as recited in Claim 110, wherein said first non-metallic phase is dispersed throughout said metal phase.

115. A paste composition as recited in Claim 110, wherein said first non-metallic phase is a ceramic dielectric compound.

116. A paste composition as recited in Claim 110, wherein said first non-metallic phase is a ceramic dielectric compound selected from the group consisting of titanates, zirconates, silicates, aluminates, tantalates and niobates.

117. A paste composition as recited in Claim 110, wherein said first non-metallic phase is a ceramic dielectric compound comprising a titanate.

118. A paste composition as recited in Claim 110, wherein said composite particles

comprise from about 0.2 to about 5 weight percent of said first non-metallic phase.

119. A paste composition as recited in Claim 110, wherein said metal phase comprises crystallites have an average crystallite size of at least about 40 nanometers.

120. A paste composition as recited in Claim 110, wherein said weight average particle size is from about 0.3 μm to about 1.5 μm.

121. A green body suitable for sintering to form a multilayer ceramic capacitor, comprising:

a) a plurality of stacked green sheets comprising a dielectric ceramic material; and

b) a thick film paste composition disposed between said sheets, wherein said thick film paste composition comprises a binder phase, an organic vehicle phase and a functional phase and wherein said functional phase comprises nickel metal particles having a substantially spherical shape and having a weight average particle size of not greater than about 5 μm and an average crystallite size of at least about 40 nanometers.

122. A green body as recited in Claim 121, wherein said nickel metal particles have a particle size distribution wherein at least about 90 weight percent of said nickel metal particles are not larger than twice said average particle size.

123. A green body as recited in Claim 121, wherein said average particle size is from about 0.3 μm to about 1.5 μm.

124. A green body as recited in Claim 121, wherein said average particle size is from about 0.3 μm to about 0.8 μm.

125. A green body as recited in Claim 121, wherein said nickel metal particles are composite particles comprising a nickel metal phase and a non-metallic phase.

126. A green body as recited in Claim 121, wherein said nickel metal particles are composite particles comprising nickel metal and a metal oxide dispersed throughout said nickel metal.

127. A green body as recited in Claim 121, wherein said nickel metal particles are composite particles comprising nickel metal and a dielectric compound selected from the group consisting of titanates, zirconates, silicates, aluminates, tantalates and niobates.

128. A green body as recited in Claim 121, wherein said nickel metal particles are composite particles comprising nickel metal and a dielectric compound comprising a titanate.

129. A green body as recited in Claim 121, wherein said nickel metal particles are coated particles comprising a coating substantially encapsulating said particles.

130. A green body as recited in Claim 121, wherein said nickel metal particles are coated particles comprising a metal oxide coating substantially encapsulating said particles.

131. A green body as recited in Claim 121, wherein said nickel metal particles are coated particles comprising a noble metal coating.

132. A green body as recited in Claim 121, wherein said nickel metal particles are coated particles comprising a silver metal coating.

133. A green body as recited in Claim 121, wherein said nickel metal particles are coated particles comprising a copper metal coating and wherein said dielectric ceramic comprises neodymium titanate.

134. A multilayer ceramic capacitor formed from a green body as recited in Claim 121.

135. An intermediate component for a microelectronic device, wherein said component comprises an insulative substrate and a thick film paste disposed on said substrate, said thick film paste comprising nickel metal particles having a weight average particle size of not greater than about 5 μm and a particle size distribution wherein at least about 90 weight percent of said particles are not larger than twice said average particle size and wherein said nickel metal particles comprise crystallites having an average crystallite size of at least about 40 nanometers.

136. An intermediate component as recited in Claim 134, wherein said substrate comprises a ceramic.

137. An intermediate component as recited in Claim 135, wherein said substrate is a green ceramic sheet.

138. An intermediate component as recited in Claim 135, wherein said substrate is a sintered ceramic substrate.

139. An intermediate component as recited in Claim 135, wherein said weight average particle size is from about 0.3 μm to about 1.5 μm.

140. An intermediate component as recited in Claim 135, wherein said microelectronic device is a multilayer ceramic capacitor and wherein said thick film paste is adapted to form an internal electrode of said capacitor.

141. An intermediate component as recited in Claim 135, wherein said thick film paste is adapted to form a plurality of conductive traces disposed in substantially parallel relation and having an average pitch of not greater than about 25 μm.

142. An intermediate component as recited in Claim 135, wherein said microelectronic device is a multichip module.

143. A multilayer ceramic capacitor, comprising:

a) a plurality of ceramic dielectric layers;

b) a plurality of internal electrode layers disposed between said dielectric layers; and

c) external electrodes connected to said internal electrodes, wherein said internal electrodes are formed from nickel particles having a weight average particle size of from about 0.3 μm to about 1.5 μm and an average crystallite size of at least about 40 nanometers.

144. A multilayer capacitor as recited in Claim 143, wherein said weight average particle size is from about 0.3 μm to about 0.8 μm.

145. A multilayer capacitor as recited in Claim 143, wherein said nickel metal particles are substantially spherical.

146. A multilayer capacitor as recited in Claim 143, wherein said nickel metal particles are composite metal particles comprising nickel metal and a ceramic dielectric compound selected from the group consisting of titanates, zirconates, silicates, aluminates, tantalates and niobates.

147. A multilayer capacitor as recited in Claim 143, wherein said nickel metal particles are composite metal particles comprising nickel metal and a ceramic dielectric compound comprising a titanate.

148. A multilayer ceramic capacitor as recited in Claim 143, wherein said nickel metal particles are composite particles comprising nickel metal and barium titanate.

149. A multilayer ceramic capacitor as recited in Claim 143, wherein said internal electrode layers have an average thickness of not greater than about 2 μm.

150. A method for the production of nickel metal particles, comprising the steps of:

a) generating an aerosol of droplets from a liquid wherein said liquid comprises a nickel metal precursor and wherein said droplets have a droplet size distribution wherein at least about 80 weight percent of said droplets have a size of from about 1 μm to about 5 μm;

b) moving said droplets in a carrier gas; and

c) heating said droplets to remove liquid therefrom and form nickel metal particles comprising at least about 50 weight percent nickel metal.

151. A method as recited in Claim 150, wherein said carrier gas comprises hydrogen.

152. A method as recited in Claim 150, wherein said carrier gas comprises at least about 2 volume percent hydrogen.

153. A method as recited in Claim 150, wherein said carrier gas comprises hydrogen and an inert gas selected from the group consisting of nitrogen, argon, helium and xenon.

154. A method as recited in Claim 150, wherein said heating step comprises carrying said droplets through a heating zone having a reaction temperature of not greater than about 1455° C.

155. A method as recited in Claim 150, wherein said heating step comprises carrying said droplets through a heating zone having a reaction temperature of at least about 1200°C.

156. A method as recited in Claim 150, wherein said heating step comprises carrying said droplets through a heating zone having a temperature of from about 1200°C to about 1400°C.

157. A method as recited in Claim 150, wherein said heating step comprises carrying said droplets through a heating zone having a temperature of from about 1200° C to about 1400° C and wherein said carrier gas comprises at least about 2.5 volume percent

hydrogen.

158. A method as recited in Claim 150, wherein said metal particles have a particle density of at least about 7.1 g/cc.

159. A method as recited in Claim 150, wherein said metal particles have a particle density of at least about 8.0 g/cc.

160. A method as recited in Claim 150, wherein said droplets have a size distribution such that not more than about 20 weight percent of the droplets in said aerosol are larger than about twice the weight average droplet size.

161. A method as recited in Claim 150, wherein said step of generating an aerosol comprises the step of removing a first portion of droplets from said aerosol, wherein said removed droplets have an aerodynamic diameter greater than a preselected maximum diameter.

162. A method as recited in Claim 150, further comprising the step of concentrating said aerosol by removing a second portion of said droplets from said aerosol, wherein said second portion of droplets have an aerodynamic diameter less than a preselected minimum diameter.

163. A method as recited in Claim 150, wherein said liquid is a solution comprising a nickel metal precursor selected from the group consisting of nickel nitrate, nickel hydroxide, nickel chloride, nickel sulfate and nickel oxalate.

164. A method as recited in Claim 150, wherein said liquid is a solution comprising nickel nitrate.

165. A method as recited in Claim 150, wherein said liquid is a solution comprising from about 5 to about 15 weight percent nickel in the form of nickel nitrate.

166. A method as recited in Claim 150, wherein said liquid comprises a nickel metal

precursor and a reducing agent.

167. A method as recited in Claim 150, wherein said liquid comprises nickel nitrate and hydrazine.

168. A method as recited in Claim 150, wherein said liquid further comprises a densification aid.

169. A method as recited in Claim 150, wherein said liquid further comprises urea.

170. A method as recited in Claim 150, wherein said liquid further comprises a precursor to at least one metal alloying element.

171. A method as recited in Claim 150, further comprising the step of coating an outer surface of said nickel metal particles.

172. A method as recited in Claim 150, wherein said nickel metal particles are composite particles comprising a non-metallic phase dispersed throughout said particles.

173. A method as recited in Claim 150, wherein said liquid further comprises a coating precursor and wherein said nickel metal particles are coated nickel metal particles.

174. A method for the production of metal composite particles, comprising the steps of:

a) forming a liquid solution comprising a metal precursor and a non-metallic phase precursor;

b) generating an aerosol of droplets from said liquid solution;

c) moving said droplets in a carrier gas;

d) heating said droplets to remove liquid therefrom and form metal composite particles comprising a metal phase and a non-metallic phase.

175. A method as recited in Claim 174, wherein said metal phase comprises nickel metal.

176. A method as recited in Claim 174, wherein said carrier gas comprises hydrogen.

177. A method as recited in Claim 174, wherein said heating step comprises passing said droplets through a heating zone having a reaction temperature of not greater than about 1455° C.

178. A method as recited in Claim 174, wherein said heating step comprises passing said droplets through a heating zone having a reaction temperature of at least about 1200° C.

179. A method as recited in Claim 174, wherein said heating step comprises passing said droplets through a heating zone having a reaction temperature of from about 1200° C to about 1400° C and wherein said carrier gas comprises at least about 2.5 volume percent hydrogen.

180. A method as recited in Claim 174, wherein said metal composite particles have a particle density of at least about 90 percent of the theoretical density for said composite particles.

181. A method as recited in Claim 174, wherein said aerosol droplets have an average droplet size of from about 1 μm to about 5 μm and wherein not more than about 20 weight percent of said droplets are larger than about twice said average droplet size.

182. A method as recited in Claim 174, wherein said step of generating an aerosol comprises the step of removing a first portion of droplets from said aerosol wherein said droplets in said removed first portion have an aerodynamic diameter greater than a preselected maximum diameter.

183. A method as recited in Claim 174, further comprising the step of concentrating said aerosol and removing a second portion of said droplets from said aerosol, wherein said droplets in said removed second portion have an aerodynamic diameter less than a preselected minimum diameter.

184. A method as recited in Claim 174, wherein said metal precursor is a nickel metal precursor selected from the group consisting of nickel nitrate, nickel hydroxide, nickel chloride, nickel sulfate and nickel oxalate.

185. A method as recited in Claim 174, wherein said metal precursor is nickel nitrate.

186. A method as recited in Claim 174, wherein said liquid comprises nickel nitrate and a reducing agent.

187. A method as recited in Claim 174, wherein said non-metallic phase precursor comprises a metal salt dissolved in said liquid solution.

188. A method as recited in Claim 174, wherein said non-metallic phase precursor comprises particles suspended in said liquid solution.

189. A method as recited in Claim 174, wherein said non-metallic phase is a metal oxide.

190. A method as recited in Claim 174, wherein said non-metallic phase is selected from the group consisting of titanates, zirconates, silicates, aluminates, tantalates and niobates.

191. A method as recited in Claim 174, wherein said metal composite particles comprise nickel metal and not greater than about 25 weight percent of a non-metallic phase selected from the group consisting of titanates, zirconates and niobates.

192. A method as recited in Claim 174, wherein said non-metallic phase is selected from the group consisting of barium titanate and neodymium titanate.

193. A method as recited in Claim 174, further comprising the step of coating an outer surface of said metal composite particles.

194. A method for the production of metal alloy particles, comprising the steps of:

a) forming a liquid solution comprising a nickel metal precursor and a second metal precursor;

b) generating an aerosol of droplets from said liquid solution;

c) moving said droplets in a carrier gas;

d) heating said droplets to remove liquid therefrom and form metal alloy particles comprising nickel metal and a second metal.

195. A method as recited in Claim 194, wherein said carrier gas comprises hydrogen.

196. A method as recited in Claim 194, wherein said heating step comprises passing said droplets through a heating zone having a reaction temperature of not greater than about 1455° C.

197. A method as recited in Claim 194, wherein said heating step comprises passing said droplets through a heating zone having a reaction temperature of from about 1200° C to about 1400° C.

198. A method as recited in Claim 194, wherein said metal alloy particles have a particle density of at least about 90 percent of the theoretical density for said metal alloy particles.

199. A method as recited in Claim 194, wherein said aerosol droplets have an average droplet size of from about 1 μm to about 5 μm and wherein not more than about 20 weight percent of said droplets are larger than about twice said average droplet size.

200. A method as recited in Claim 194, wherein said step of removing a first portion of droplets from said aerosol wherein said droplets in said removed first portion have an aerodynamic diameter greater than a preselected maximum diameter.

201. A method as recited in Claim 194, further comprising the step of removing a

second portion of said droplets from said aerosol, wherein said droplets in said removed second portion have an aerodynamic diameter less than a preselected minimum diameter.

202. A method as recited in Claim 194, wherein said nickel metal precursor is selected from the group consisting of nickel nitrate, nickel hydroxide, nickel chloride, nickel sulfate and nickel oxalate.

203. A method as recited in Claim 194, wherein said nickel metal precursor is nickel nitrate.

204. A method as recited in Claim 194, wherein said liquid comprises nickel nitrate and hydrazine.

205. A method as recited in Claim 194, wherein said liquid further comprises a densification aid.

206. A method as recited in Claim 194, wherein said second metal is selected from the group consisting of palladium, gold, copper, tungsten, molybdenum, tin, platinum, iron and cobalt.

207. A method as recited in Claim 194, wherein said second metal is palladium.

208. A method as recited in Claim 194, wherein said metal alloy particles comprise nickel metal and from about 0.1 to 40 weight percent of said second metal.

209. A method as recited in Claim 194, wherein said metal alloy particles are homogeneously alloyed with substantially no phase segregation of said nickel metal and said second metal.

210. A method as recited in Claim 194, further comprising the step of coating an outer surface of said metal alloy particles.

211. A method for the production of coated nickel metal particles, comprising the steps of:

a) forming a liquid solution comprising a nickel metal precursor;

b) generating an aerosol of droplets from said liquid solution;

c) moving said droplets in a carrier gas;

d) heating said droplets to remove liquid therefrom and form metal particles comprising nickel metal; and

e) coating an outer surface of said nickel metal particles.

212. A method as recited in Claim 211, wherein said coating step comprises contacting said metal particles with a volatile coating precursor.

213. A method as recited in Claim 211, wherein said coating step comprises contacting said metal particles with a volatile coating precursor selected from the group consisting of metal chlorides, metal acetates and metal alkoxides.

214. A method as recited in Claim 211, wherein said carrier gas comprises hydrogen.

215. A method as recited in Claim 211, wherein said heating step comprises passing said droplets through a heating zone having a reaction temperature of not greater than about 1455° C.

216. A method as recited in Claim 211, wherein said heating step comprises passing said droplets through a heating zone having a reaction temperature of at least about 1200°C.

217. A method as recited in Claim 211, wherein said coated metal particles have a particle density of at least about 90 percent of the theoretical density for said metal particles.

218. A method as recited in Claim 211, wherein said aerosol droplets have an average size of from about 1 μm to about 5 μm and wherein not greater than about 20 weight percent of said droplets are larger than about twice said average droplet size.

219. A method as recited in Claim 211, wherein said step of generating an aerosol comprises the step of removing a first portion of droplets from said aerosol wherein said droplets in said removed first portion have an aerodynamic diameter greater than a preselected maximum diameter.

220. A method as recited in Claim 211, further comprising the step of removing a second portion of said droplets from said aerosol, wherein said droplets in said removed second portion have an aerodynamic diameter less than a preselected minimum diameter.

221. A method as recited in Claim 211, wherein said nickel metal precursor is selected from the group consisting of nickel nitrate, nickel hydroxide, nickel chloride, nickel sulfate and nickel oxalate.

222. A method as recited in Claim 211, wherein said nickel metal precursor is nickel nitrate.

223. A method as recited in Claim 211, wherein said liquid comprises a nickel metal precursor comprising nickel nitrate and a reducing agent comprising hydrazine.

224. A method as recited in Claim 211, wherein said coating is a metal oxide.

225. A method as recited in Claim 211, wherein said coating has an average thickness of not greater than about 100 nanometers.

226. A method as recited in Claim 211, wherein said coating has an average thickness of not greater than about 50 nanometers.

227. A method as recited in Claim 211, wherein said coating comprises a metal oxide selected from the group consisting of SiO_2, Al_2O_3, ZrO_2, B_2O_5, TiO_2, Cu_2O, CuO, V_2O_5 and Bi_2O_3.

228. A method for forming a plurality of electrodes for a plasma display panel, comprising the steps of:

a) providing a thick film paste comprising nickel particles;

b) applying said thick film paste to a plasma display panel; and

c) heating said thick film paste to form nickel electrodes adhered to said panel, wherein said nickel particles are substantially spherical, have a weight average particle size of not greater than about 5 μm and wherein at least about 90 weight percent of said metal particles are not greater than about twice said average particle size.

229. A method as recited in Claim 228, wherein said nickel electrodes have an average thickness of not greater than about 25 μm.

230. A plasma display panel formed by the method recited in Claim 228.